

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371FILED: OCTOBER 6, 2000  
320.38785X00

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/647896

INTERNATIONAL APPLICATION NO.

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

18 October 1999 (18.10.99)

TITLE OF INVENTION DEVICE FOR MOISTENING A MATERIAL WEB

APPLICANT(S) FOR DO/EO/US HAHNE, Ernst August and KNOPF, Franz

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

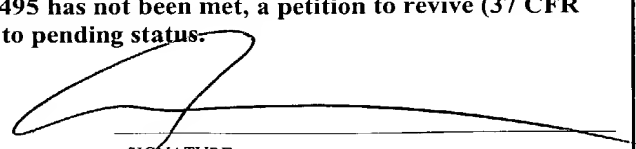
**Items 11. to 16. below concern document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.  
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☒ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

PCT Request Form

Figure 1

Credit Card Payment Form

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) <b>05/647896</b>		INTERNATIONAL APPLICATION NO.		ATTORNEY'S DOCKET NUMBER <b>320.38785X00</b>	
17. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$970.00</b> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO. .... <b>\$840.00</b> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$690.00</b> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$670.00</b> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$96.00</b>  <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS</b> PTO USE ONLY	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	9 - 20 =	0	X \$18.00	\$ 0.00	
Independent claims	1 - 3 =	0	X \$78.00	\$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	\$ 0.00	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 860.00	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$ 0.00	
<b>SUBTOTAL =</b>				\$ 860.00	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
<b>TOTAL NATIONAL FEE =</b>				\$ 860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property				\$ 40.00	
<b>TOTAL FEES ENCLOSED =</b>				\$ 900.00	
				Amount to be refunded:	\$
				charged:	\$
a. <input checked="" type="checkbox"/> Credit Card Pymt Form A in the amount of \$ <u>900.00</u> to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>01-2135</u> . A duplicate copy of this sheet is enclosed.					
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>					
SEND ALL CORRESPONDENCE TO:  Alan E. Schiavelli ANTONELLI, TERRY, STOUT & KRAUS 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209					
				SIGNATURE.  Alan E. Schiavelli NAME <u>32,087</u> REGISTRATION NUMBER	

09/647896

529 Rec'd PCT/PTO 06 OCT 2000

320.38785X00

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: HAHNE et al  
Serial No.:  
Filed: October 6, 2000  
For: Device For Moistening A Material Web  
Group:  
Examiner:

**PRELIMINARY AMENDMENT**

Assistant Commissioner  
for Patents  
Washington, D.C. 20231

October 6, 2000

Sir:

Prior to examination on the merits of this application and prior to calculation of the filing fee, please amend the above-identified application as follows:

**IN THE CLAIMS:**

Claim 4, line 1, delete "2 or".

Claim 5, line 1, delete "one of Claims 1 to 4" and insert --Claim 1--.

Claim 6, line 1, delete "one of Claims 1 to 5" and insert --Claim 1--.

Claim 7, line 1, delete "one of Claims 1 to 6" and insert --Claim 1--.

Claim 8, line 1, delete "one of Claims 1 to 7" and insert --Claim 1--.

**REMARKS**

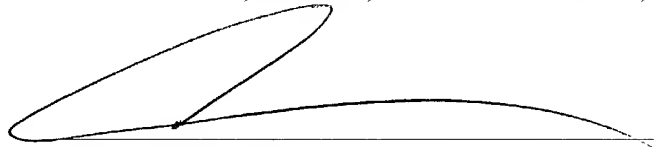
The foregoing amendments are respectfully requested prior to examination on the merits of this application.

To the extent necessary, applicants petition for an extension of time under 37

CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 320.38785X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

A handwritten signature in black ink, appearing to read 'Alan E. Schiavelli', written over a horizontal line.

Alan E. Schiavelli  
Registration No. 32,087

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(703) 312-6600

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum  
Internationales Büro



(43) Internationales Veröffentlichungsdatum  
26. April 2001 (26.04.2001)

PCT

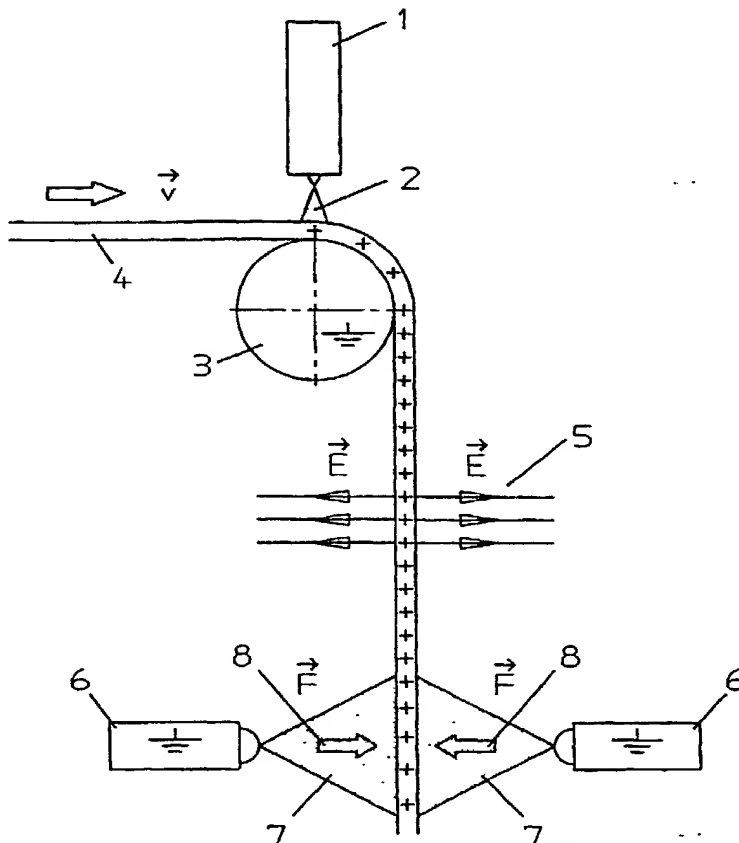
(10) Internationale Veröffentlichungsnummer  
**WO 01/28693 A1**

- (51) Internationale Patentklassifikation<sup>7</sup>: B05B 5/14, B05D 1/04
- (21) Internationales Aktenzeichen: PCT/EP00/05478
- (22) Internationales Anmeldedatum: 14. Juni 2000 (14.06.2000)
- (25) Einreichungssprache: Deutsch
- (26) Veröffentlichungssprache: Deutsch
- (30) Angaben zur Priorität: 199 50 009.6 18. Oktober 1999 (18.10.1999) DE
- (71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von US): ELTEX-ELEKTROSTATIK GMBH [DE/DE]; Blauenstrasse 67, D-79576 Weil am Rhein (DE).
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- (74) Anwalt: SÄGER, Manfred; Postfach 63, CH-7014 Trin (CH).
- (81) Bestimmungsstaaten (national): JP, US.

[Fortsetzung auf der nächsten Seite]

(54) Title: DEVICE FOR HUMIDIFYING A MATERIAL WEB

(54) Bezeichnung: VORRICHTUNG ZUM BEFEUCHTEN EINER MATERIALBAHN



(57) Abstract: The invention relates to a device for humidifying a material web (4), conveyed in a transport direction (v), preferably for re-humidifying a paper or textile web which has been dried after a printing process, using a spray device (6) for spraying a mist of water onto the material web (4) under the effect of an electrostatic field which is generated by an electrostatic charging device (1), whereby an idler roll (3) for deviating the material web (4) is provided in front of the spray device (6) in the direction of transport (v), a device configured as a corona charging electrode (1) for electrostatic charging is allocated to the idler roll (3), and the spray device has two water spray heads, positioned on both sides of the material web (4).

(57) Zusammenfassung: Die Erfindung betrifft eine Vorrichtung zum Befeuchten einer in Transportrichtung (v) bewegten Materialbahn (4), vorzugsweise zum Wiederbefeuchten einer nach dem Bedrucken getrockneten Papier- oder Textilbahn, mittels einer Sprüheinrichtung (6) zum Aufsprühen eines Wassernebels auf die Materialbahn (4) unter Einwirkung eines elektrostatischen Feldes, das von einer Einrichtung (1) zum elektrostatischen Aufladen erzeugt wird, wobei in Transportrichtung (v) vor der Sprüheinrichtung (6) eine Umlenkwalze (3) zum Umlenken der Materialbahn (4) vorgesehen ist; der Umlenkwalze (3) eine als Koronaaufladeelektrode (1) ausgebildete Einrichtung zum elektrostatischen Aufladen zugeordnet ist; und die Sprüheinrichtung zwei Wassersprühköpfe (6) aufweist, die auf beiden

Seiten der Materialbahn (4) angeordnet sind.

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## DEVICE FOR MOISTENING A MATERIAL WEB

The invention relates to a device for moistening a material web moved in the transport direction, preferably for re-moistening a paper or textile web dried after printing by means of a spray device for spraying a water mist on the material web under the influence of an electrostatic field generated by an electrostatic charging device according to the preamble of the main claim.

Devices for re-moistening of this type are known of themselves (EP-0 350 606 A2). They have proven themselves in practice. It is disadvantageous however that these known systems usually are difficult to retrofit in existing systems. Finally, only a moderate degree of re-moistening can be achieved with this known device.

The goal of the invention is to improve a device according to the species according to the preamble of the main claim so that a high degree of moistening can be achieved with small installation sizes.

This goal is achieved in a device according to the species according to the preamble of the main claim according to the invention by these characterizing features.

It is important for the principle according to the invention that the material web was charged electrostatically in a transport direction before the spraying device (surprisingly more than in the area of the corona electrode in the vicinity outside of the reversing roller) and the material web thus charged influences the sprayed water mist as a result of the electrical field due to the charging, so that the water particles of the spray mist

surprisingly are sucked up by the material web, in other words, the water aerosols with opposite charges relative to the paper penetrate the material while astonishingly the applied amount of water (about  $2.5 \text{ g/m}^2$ ) has not led to any formation of surface water on the material web. In addition, the moisture profile of the water spray heads has not formed itself on the material web, which may be due to the dominance of the high and uniform distribution of the field strength in the form of a homogeneous field. With this design according to the invention, an efficiency of more than 95% and sometimes even 98% has been reached. In contrast to the known devices, this also has the advantage that significantly less components are required which is directly related to the space requirements of such a device for re-moistening. The latter has the particular advantage of being able to retrofit existing pressure systems simply.

Advantageous designs and improvements on the invention are characterized in the subclaims.

A preferred embodiment of the invention is explained in greater detail with reference to the drawing and represents a schematic functional diagram with the device according to the invention.

The material web marked 4 as a whole is guided in the transport direction  $v$  around a reversing roller represented as a whole by 3 (in the embodiment shown) with a wrap angle of  $90^\circ$ .

As an extension of the diameter passing through the tangent point (in the schematic cross section) the device represented as 1 as a whole is shown to perform electrostatic charging as a corona-charging electrode 1, with the charging direct current being represented by 2 which flows onto the

surface of material web 4. It is approximately 2 mA/m. The area of the material web is viewed as a tangent line which touches the jacket of reversing roller 3 in the transport direction.

Reversing roller 3 is a grounded drum which has a smooth, electrically conducting surface which is preferably high-gloss chrome-plated. It has been found that with this design of the charging electrode the material web is charged to its physically maximum field strength so that the electrical field E marked 5 results.

Material web 4 is then guided in the area of two grounded water spray heads 6 located opposite one another on different sides of material web 4. These heads form a spray cone marked schematically as a whole by 7. As a result of the influence, a field strength F marked as a whole by 8 acts on the water aerosols which it forces three-dimensionally into the interior of material web 4.

It is also possible instead of grounding to apply reverse polarity to reversing roller 3 and water spray heads 6. It is also possible for the top side of reversing roller 3 to be coated with polytetrafluoroethylene or risilan to prevent residues of printing ink separating from material web 4 at the surface of the roller.

With this design according to the invention, an efficiency of more than 95% and sometimes even 98% has been reached. In contrast to the known devices, there is also the advantage that definitely fewer components are required which is directly related to the associated space requirements of such a device for re-moistening. The latter has the particular advantage of being able to retrofit existing printing systems in simple fashion.



## CLAIMS

1. Device for moistening a material web (4) moved in transport direction (v) preferably for re-moistening of a paper or textile web dried after printing by means of a spray device (6) for spraying a water fog onto the material web (4) under the influence of an electrostatic field generated by a device for electrostatic charging (1) characterized in that

- a reversing roller (3) for reversing material web (4) is provided in the transport direction (v) upstream of spray device (6),
- that reversing roller (3) has associated with it a device for electrostatic charging designed as a corona-charging electrode (1),
- and that the spray device has two water spray heads (6) located on both sides of material web (4).

2. Device according to Claim 1 characterized in that reversing roller (3) has a smooth surface that is a good electrical conductor.

3. Device according to Claim 2 characterized in that reversing roller (3) is high-gloss chrome-plated.

4. Device according to Claim 2 or 3 characterized in that reversing roller (3) is grounded.

5. Device according to one of Claims 1 to 4 characterized in that the jacket of reversing roller (3) has on top of the smooth surface a thin coating, preferably of polytetrafluoroethylene or risilan.

6. Device according to one of Claims 1 to 5 characterized in that reversing roller (3) is wrapped around material web (4) in an angle range that forms at least a right angle.

7. Device according to one of Claims 1 to 6 characterized in that corona-charging electrode (1) is located in the plane spanned by the axis of reversing roller (3) and the tangent line in the area in which material web (4) runs onto the jacket of reversing roller (3).

8. Device according to one of Claims 1 to 7 characterized in that the water spray heads (6) directed at the surface of material web (4) are grounded.

9. Device according to Claim 8 characterized in that the two water spray heads (6) are located opposite one another on the two sides of material web (4).

**ABSTRACT**

The invention relates to a device for moistening a material web moved in the transport direction, preferably for re-moistening a paper or textile web dried after printing by means of a spray device for spraying a water fog onto the material web under the influence of an electrostatic field produced by a device for electrostatic charging characterized by the fact that

- a reversing roller is provided in the transport direction upstream of the spray device for deflecting the material web,
- that the reversing roller has associated with it a device designed as a corona-charging electrode for electrostatic charging,
- and that the spray device has two water spray heads located on both sides of the material web.

## DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I/we hereby declare that:

My/Our residence, post office address and citizenship are as stated below next to my/our name, I/we believe that I/we are the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DEVICE FOR MOISTENING A MATERIAL WEB

the specification of which (check one)

☒ is attached hereto

☐ was filed on \_\_\_\_\_

As Application Serial No. \_\_\_\_\_

And was amended on \_\_\_\_\_

(If Applicable)

I/We hereby state that I/we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I/We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I/We hereby claim benefit under Title 35, United States Code, §119 of any provisional application(s) and any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the foreign application(s) on which priority is claimed:

Provisional and/or Foreign Application(s)

Priority Claimed

<u>199 50 009.6</u>	<u>GERMANY</u>	<u>18/10/1999</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I/We hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims, of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I/we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §156(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status: patented, pending, abandoned)</u>
_____	_____	_____
<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status: patented, pending, abandoned)</u>
_____	_____	_____
<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status: patented, pending, abandoned)</u>
_____	_____	_____
<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status: patented, pending, abandoned)</u>
_____	_____	_____

10 I hereby appoint as principal attorneys; Donald R. Antonelli, Reg. No. 20,296; David T. Terry, Reg. No. 20,178; Melvin Kraus, Reg. No. 22,466; William I. Solomon, Reg. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973, and Carl I. Brundidge, Reg. No. 29,621 to prosecute and transact all business connected with this application and any related United States application and international applications. Please direct all communications to the following address:

ANTONELLI, TERRY, STOUT & KRAUS, LLP  
Suite 1800  
1300 North Seventeenth Street  
Arlington, Virginia 22209  
Telephone: (703) 312-6600  
Fax: (703) 312-6666

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United State Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

1W Date 16 Aug 2000 Inventor Ernst August HAHNE (Full Name) Schweiz / Switzerland (Signature)  
 Residence Oberer Rosenbergweg 26, CH-4123 ALLSCHWIL, Germany Citizenship GERMAN  
 Post Office Address Same as Above

2W Date 16 Aug 2000 Inventor Franz KNOPE Franz Knopf  
 Residence Kantstrabe 2, D-77815 BUIHL, Germany Citizenship GERMAN  
 Post Office Address Same as Above

Date \_\_\_\_\_ Inventor \_\_\_\_\_  
 Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
 Post Office Address \_\_\_\_\_

Date \_\_\_\_\_ Inventor \_\_\_\_\_  
 Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
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